3GPP TSG RAN WG1 Meeting #112bis-e R1-23xxxxx

e-Meeting, April 17th – April 26th, 2023

**Title: [Draft] Reply LS to RAN4 on LP WUR architectures**

**Response to: R1-2302287 /** **R4-2303712**

**Release: Rel-18**

**Work Item: FS\_NR\_LPWUS**

**Source: [Apple]**

**To: RAN4**

**Cc:**

**Contact person: [Sigen Ye]**

 **[sigen\_ye@apple.com]**

**Send any reply LS to: 3GPP Liaisons Coordinator,** **mailto:3GPPLiaison@etsi.org**

**Attachments:** **None**

# 1 Overall description

RAN1 would like to thank RAN4 for the reply LS on low-power wake-up receiver architectures.

RAN1 would like to provide the following feedback on the clarification questions from RAN4.

1. **Whether IoT/wearables/smartphone UE types are all considered for LP-WUR design**

[RAN1 response] Yes. RAN1 has reached the following agreement, and IoT/wearables/smartphone UE types are all considered.

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| **Agreement**The following characteristics for target use cases are considered in the study item:* IoT cases including e.g., industrial wireless sensors, controllers, actuators and etc, including the following characteristics,
	+ FFS: latency
	+ primary for small form devices
	+ power-sensitive
	+ static, nomadic or limited mobility
* Wearable cases including e.g., smart watches, rings, eHealth related devices, and medical monitoring devices etc.,
	+ FFS: latency
	+ primary for small form devices,
	+ power-sensitive
	+ low/medium speed, FFS: high speed
* eMBB cases including e.g., XR/smart glasses, smart phones and etc.,
	+ FFS: latency
	+ devices form is various and not restricted
	+ power-sensitive
	+ low/medium speed, FFS: high speed

Note: other use cases/characteristics are not precluded if any. |

1. **Power consumption, coverage and SNR targets**

[RAN1 response] So far RAN1 has not reached any agreement on power consumption, coverage and SNR targets. RAN1 is still studying all these aspects.

1. **Max occupied RB number in channel bandwidth for LP-WUS, for 1.4MHz and 5MHz RF bandwidth case**

[RAN1 response] RAN1 is performing link level simulations to evaluate the guard band that may be needed in different cases for different WUS design.

1. **Possible supported SCS for LP-WUS, if applicable**

[RAN1 response] RAN1 has reached the following agreement on SCS. The implication of different SCS for LP-WUS generation and other NR transmission is still under study.

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| **Agreement**For MC-ASK or MC-FSK waveform generation, SCS of a CP-OFDM symbol used for LP-WUS generation can be the same as SCS used for other NR transmissions in CP-OFDM symbol overlapping in time with, study whether SCS can be different, also study* FDM/TDM multiplexing with other NR transmissions
* link performance
* impact to legacy UEs
* impact on gNB
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1. **Whether WUS can be located in a band separate from the UE’s NR band**

[RAN1 response] RAN1 thinks at least the case where WUS is located in the same band as the UE’s NR band should be considered for the design. A separate band for WUS is not precluded.

1. **Whether FR1 is considered as first priority frequency range**

[RAN1 response] Yes, FR1 should be considered as first priority.

1. **Whether in-band power boosting of LP-WUS is considered from RAN1 perspective**

[RAN1 response] Yes, in-band power boosting is considered from RAN1 perspective. RAN1 would appreciate any feedback from RAN4 on the extent of power boosting that can be assumed in RAN1 study.

# 2 Actions

**To RAN4:**

**ACTION:** RAN1 respectfully asks RAN4 to take the above into consideration.

# 3 Dates of next TSG RAN WG1 meetings

TSG RAN WG1 Meeting #113 May 22-26, 2023 Incheon, KR

TSG RAN WG1 Meeting #114 August 21-25, 2023 Toulouse, FR